Content

1.0 Purpose/Scope This field procedure provides standardization of the method for the MSA *Kwik-Draw*® pump and its indicator tubes (detector tubes). It allows relatively inexperienced field testers to gain accurate, instantaneous results.

The *Kwik-Draw* system, when used properly with its matching detector tubes, is designed to reliably test more than 120 hazardous gases and vapors. Due to the approximate 25% margin of error in the test at the TLV/PEL, the results of the *Kwik-Draw*, it is best if these results are not the only evidence of the presence or absence of a particular substance in employee exposure monitoring scenarios. The *Kwik-Draw* system should be used in conjunction with other test means or information to confirm the identity of an unknown atmosphere when appropriate.

2.0 Responsibilities This procedure will be implemented through the SHSD Industrial Hygiene Group, RCD Facility Support Group, and other appropriate BNL organizations to address concerns of the presence of atmospheric contaminants, primarily in emergency situations and for leak detection. This procedure can be used to measure atmospheric concentrations in operating processes and equipment when more accurate methods are

not available. Only persons who thoroughly understood this procedure should use the *Kwik-Draw* system.

2.1 Program Administration: This procedure is administered through the SHSD Industrial Hygiene Group. Members of the SHSD Industrial Hygiene Group are required to follow this procedure. Employees of other BNL organizations are required to follow this SOP or an equivalent document that ensures an equal or superior method of assessment documentation and recordkeeping.

2.2 *Industrial Hygiene Professional:* The *Industrial Hygiene Professional* of SHSD and other BNL organizations are to be qualified by their supervision. These individuals will conduct or supervise industrial hygiene hazard assessments and personal exposure monitoring using this procedure. These *IH Professionals* are responsible for:

- Interpreting, reporting, and documenting personal exposure monitoring in accordance with the requirements of this procedure, other appropriate SOPs, and generally accepted professional standards and practices.
- Ensuring a quality report is prepared that documents the exposure, evaluates the relevance to exposure standards, and recommends protective and corrective actions.
- Ensuring the final report is provided in a timely manner to all appropriate parties.
- Ensuring that the appropriate data is correctly and completely entered into the BNL IH exposure monitoring database (i.e. *Compliance Suite*®).
- Ensuring that original records of sampling and analysis enter the SHSD *Record Custodian* filing system.

2.3 *Industrial Hygiene Technician (Sampler)*: The industrial hygiene technician is to be qualified by their supervision to conduct industrial hygiene personal exposure monitoring under the direction of his/her organization's *IH Professional.* The sampler is responsible for collecting personal exposure monitoring samples in accordance with the guidance of the *IH Professional* and the requirements of all SOP's pertinent to the particular monitoring requirements (i.e. Chain of custody, equipment check in/out, equipment operation, recordkeeping, etc.).

2.4 *Compliance Suite*® *data entry:* The management of the person conducting the sampling is responsible for entering complete and correct data into the BNL IH exposure monitoring database (i.e. *Compliance Suite*). This task may be assigned to one or more individuals who act as the data entry person for an organization, however,

it remains the responsibility of the line management of the *Sampler* to ensure this task is fulfilled within 21 calendar days of the end of the sampling event.

3.0 Definitions

3.1 ***Kwik-Draw Pump***: A manually operated bellows pump of 100-cc capacity sold by MSA, Inc. Components of the *Kwik-Draw* pumps include:

- Tube holder: Rubber mounting for attaching detector tubes or remote sampling lines.
- Filter Disc: Porous plastic disc, mounted in the rubber tube holder to protect the pump from dirt and dust particles which may alter the flow or damage the pump.
- Exhaust Valve: Valve located under the valve cover that closes as the bellows re-inflates, and opens on the exhaust stroke so that blowback through the tube holder is negligible.
- Stroke Counter: Indicator of stroke count incorporated into the pump handle.
- End-of-stroke indicator: Eyeball type indicator that turns high visibility yellow. As the bellows begins to re-inflate. When the vacuum decreases, the eye rolls back to black.

3.2 ***Detector Tubes:*** Thin tubes made of glass having two break off tips on either end. The tubes are filled with treated chemical granules specific for sampling a variety of substances. Most detector tubes are packaged 10 in a box and have a shelf life of 24 to 30 months.

4.0 Prerequisites

4.1 Prior to testing with the *Kwik-Draw* system, determine if the life expectancy date on the box of the detector tubes has expired. Do not use tubes that have exceeded the date printed on the box. If the detector tubes have expired, return the tube to the box and follow the waste disposal procedures. Do not use a tube that has exceeded its printed shelf life. Failure to do so may result in a greater margin of error or false negative indications.

4.2 Only persons who thoroughly understand this procedure and have demonstrated competency should use the *Kwik-Draw* system. Training prior to using this procedure:

4.2.1 Demonstration of proper operation of the procedure as per Section 7 for qualification requirements.

4.2.2 Other appropriate training for the area to be entered (check with ESH coordinator or FS Representative for the facility).

4.3 **Area Access**:

4.3.1 Contact the appropriate Facility Support Representative or Technician to obtain approval to enter radiological areas.

4.3.2 Verify with the appropriate Facility Support Representative or Technician if a Work Permit or Radiological Work Permit is needed or is in effect. If so, review and sign the permit.

4.3.3 Use appropriate PPE for area.

5.0 Precautions

5.1 Do not perform any test with a previously used Detector tube.

5.2 Do not perform any test with a Detector tube with an unknown or expired manufacturer's expiration date.

5.3 Verify that an interfering compound, listed in the tube instruction sheets or MSA publications, is not present.

5.4 By its very nature, the procedure may be used in areas where hazards exist or are suspected to be present. Exposures to some chemicals may cause temporary or permanent health impairments to individuals.

5.5 The operation of this equipment does not expose the operator to physical or radiological hazards. The design does not cause significant ergonomic concerns in routine use.

5.6 The tubes may be Hazardous Waste. Follow Section 6 on waste disposal procedures.

5.7 **Job Risk Assessment:** Consult the *Job Risk Assessment* on the SHSD OSH web site for the risk assessment of hazards of this SOP.

6.0 Procedure

6.1 **Routine Maintenance** (to be performed by the SHSD IH Group Technician or other competent equipment owner)

6.1.1 If shaft becomes dirty or if bellows inflation is jerky, remove the shaft by unscrewing; then clean with wax or oil.

6.1.2 Periodically check the performance of the pump.

- Plug pump inlet by inserting an unbroken Detector tube into the tube holder.
- Deflate pump fully, release, and wait 10 minutes. The pump is leak free if the distance from the bellows to the frame is ½" or greater after 10 minutes. If the pump leaks, check the tube holder and, if necessary, the replace valves.

6.1.3 Check operation of the valves (when operating performance decreases or fails)

- With valve cover removed, check the valves for dirt or debris.
- Remove dirt with a gentle puff of air or by using a soft brush.
- Replace valve if necessary.

6.1.4 Periodically remove filter disc (when operating performance decreases or fails)

- Remove the filter disc from the tube holder by rolling flange part of tube holder down and away from the disc.
- Gently tap or blow on the surface to remove any foreign matter.
- Replace Disc so previously exposed surface is once again facing away from pump.

6.2 **Equipment:**

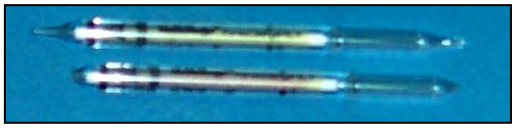
6.2.1 ***Kwik-Draw* pump**

6.2.2 **Detector tube** (listed by MSA to detect the airborne contaminant of concern).

6.3 **Test Protocol**

6.3.1 Re-Zero stroke counter on pump, by pressing the indicator advance button until "0" is displayed.

6.3.2 Using the breaker on the pump, break off both tips of the detector tube.



6.3.3 Using a twisting motion, insert the tube into the rubber tube holder. The

arrow on the tube must point toward the pump.

6.3.4 Check the number of strokes needed to complete test. (number of strokes can be found on the instruction in the box of tubes and on the tube itself; labeled as n= (number of strokes)

6.3.5 With all four fingers on the handle, depress the knob with your palm until stroke counter changes number.

6.3.6 Release knob.

6.3.7 As pump re-inflates, the end-of-stroke indicator turns to high visibility yellow. During this time the indicator must be held in the sampling area. When the pump has consumed 100cc of the sample the *end-of-stroke indicator* will return to its black color.

6.3.8 Continue making complete strokes of the pump until the n= (number of strokes) have been done. Be sure to allow the pump *end-of-stroke indicator* to return to black before each subsequent stroke.

6.3.9 At the end of n= (number of strokes), determine the air concentration by reading the appropriate scale value on the tube. The reading should at the front of the band of color change.

6.4 Record results on the "BNL Direct Reading Instrument" form. Record the MSA Kwik-Draw and type of tube on the form. Plan and conduct hazard assessments and exposure monitoring using the procedure outlined in I*H 60500 Reporting Personnel Exposure Monitoring Results* for:

- Exposure Assessment Sampling Strategy,
- Initial Notification of Employee Monitoring Results, and
- Preparation of a formal report on the exposure monitoring or hazard assessment.

6.5 **Waste Disposal:**

6.5.1 After a Detector tube has been used or identified age expired, return the tube to the original manufacturer's package (tube box.).

6.5.2 When all tubes in the package have been used or the whole package expired, dispose of the package with its tubes via the Waste Management Division. Determination of the hazardous waste category can be determined based on the chemical reactants used on the tubes. The contents of the tube can be found on the instruction sheet enclosed with the tube package.

7.0 Implementation and Training

7.1 Training prior to using this equipment includes a demonstration of proper operation of the instrument based on training, education, and experience. All persons must have met the qualification criteria set in *IH50300 BNL IH Program and IH Group Training & Qualification Matrix.*

7.2 Personnel are to document their training using Attachment 9.1, the Job Performance Measure Completion Certificate. Qualification on this JPM is required on a 3 year basis, providing the professional is monitoring noise sources frequently.

8.0 References

8.1 MSA Document: Detector Tubes and Dosimeters Data Sheet #08-00-02, (1989).

9.0 Attachments:

9.1 IH Qualification: Job Performance Measure

10.0 Documentation

Document Development and Revision Control Tracking		
PREPARED BY: *(Signature and date on file)* H. Jeanty & R. Selvey Date 07/06/00 & 09/28/01	REVIEWED BY: *(Signature and date on file)* J. Peters SHSD IH Group Date 10/02/01	APPROVED BY: *(Signature and date on file)* R. Selvey SHSD IH Group Leader Date 10/02/01
ESH Coordinator/ Date: *none*	Work Coordinator/ Date: *none*	SHSD Manager / Date *none*

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure	NUMBER **IH75170**
	REVISION **Final Rev2**
SUBJECT: INSTRUMENT OPERATION: **Atmosphere Testing Using Indicator Tubes and MSA *Kwik-Draw*® Pump**	DATE **12/08/05**
	PAGE **8** OF 10

QA Representative / Date: *none*	Training Coordinator / Date: *none*	Filing Code: **IH52**
Facility Support Rep. / Date: *none*	Environ. Compliance Rep. / Date: *none*	Effective Date: **10/02/01**
ISM Review - Hazard Categorization ☐ High ☒ Moderate ☐ Low/Skill of the craft	Validation: ☐ Formal Walkthrough ☐ Desk Top Review ☐ SME Review Name / Date:	Implementation: Training Completed: Tracked in BTMS Procedure posted on Web: 12/08/05 Hard Copy files updated: 12/08/05

Revision Log

Purpose: ☐ Temporary Change ☐ Change in Scope ☐ Periodic review ☐ Clarify/enhance procedural controls

Changed resulting from: ☐ Environmental impacts ☐ Federal, State and/or Local requirements ☐ Corrective/preventive actions to non-conformances ☒ none of the above

Section/page and Description of change: Revised to include Section 7 Implementation and Training. Text added to Section 2, 4,5, 6, and 7. JRA added to Section 5.

R. Selvey 03/30/05 *(signature on file)* SME Reviewer/Date:	Reviewer/Date:	Reviewer/Date:

Purpose: ☐ Temporary Change ☐ Change in Scope ☐ Periodic review ☐ Clarify/enhance procedural controls

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Section/page and Description of change: Revised Section 7 to reflect the BNL uniform qualification policy. Added Attachment 9.1 JPM.

R. Selvey 12/08/05 (signature on file) SME Reviewer/Date:	Reviewer/Date:	Reviewer/Date:

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Attachment 9.1

IH Qualification
Job Performance Measure

BROOKHAVEN NATIONAL LABORATORY

HP-IHP-75170

Environmental, Safety, Health & Quality Directorate
SHSD Industrial Hygiene

MSA Kwik-Draw Sampler Operation
Job Performance Measure (JPM) Completion Certificate

Candidate's Name	Life Number:

Practical Skill Evaluation: Demonstration of Evaluation Methodology by Oral Exam

Criteria	Qualifying Performance Standard	Unsat.	Recov.	Satisf.
1. Hazard Analysis	Understands the need to perform a hazard analysis of the area and potential exposure to the self as sampler and workers in the area.			
2. Personal Protective Equipment	Understands the need to be aware of the potential surface contamination, airborne levels of contaminants, radiological hazards, and noise hazard. Knows how to determine the need for PPE.			
3. Sampling Equipment	Knows where equipment needed for the procedure is located and how to properly sign it out.			
4. Pre-Testing Inspection	Verifies the system to be monitored is operational and represents typical operation. Makes notation in sampling record if the operating conditions are atypical.			
5. Measurement of hazard	Knows how to properly measure employee exposure to hazardous chemical levels.			
6. Operating Parameters	Knows the theory to establish operating parameters (safety envelope) for the equipment. Knows to make drawing or take of photo of the operation.			
7. Operating Parameters	Knows how to make measurements with the pump and how to read the results. Demonstrates a full stroke and proper filling time. Points out the strike counter.			
8. Documentation	Demonstrates correctly filling out IH forms, transfers appropriate info to IH databases, prepares an evaluation assessment report (including an evaluation of the relationship of the exposure to occupational exposure limits), and notify workers and management of the results.			

I accept the responsibility for performing this task as demonstrated within this JPM and the corresponding SOP.

Candidate Signature:	Date:

I certify the candidate has satisfactorily performed each of the above listed steps and is capable of performing the task unsupervised.

Evaluator Signature:	Date: